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E-learning pedagogy

Jennifer Herndon, MA and Gregory B. Baecher, PhD

Summary

E-Learning is an on-line environment where students use technology to learn new skills. E-learning is effective in part because students and instructors can use it at any time and in any place; instructors can adapt content presentation to meet individual student needs; learners actively use new knowledge for practical applications; and organizations can reduce the significant costs of travel. Colleges, businesses, and the military are all benefiting from e-learning. There are, however, potential disadvantages, including student fears of technology, poor content organization, and lack of authentic learning. Pedagogy is the art or science of teaching. Because e-learning necessarily involves teaching, it is essential to develop methods of successful practice so that students can learn. A teacher, must consider his or her role in an e-learning environment. Students need instructor feedback as well as assessments to test comprehension. Students learn most successfully in an environment of collaborative interaction with other students. It is essential for teachers to help students stay motivated and on track, because technology-based learning can lead to feelings of isolation. Teachers must also structure content and presentation of new material to increase comprehension and decrease misunderstandings and frustration.

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What is e-Learning?

Businesses and academic institutions are turning to technology based training in order to save money and to develop learning strategies that achieve institutional goals. Business leaders are searching for ways to reduce training cost and employee time away from the office; they are turning towards technology, and more specifically, the Internet, to enable employees to learn new skills and product information at their own locations, and usually at their own pace. Consequently, it is no longer necessary to send employees to a distant location to learn new skills, learning can happen at any time and any place. Just as importantly, skills can be learned when they are needed. Colleges and universities are also using Internet technology to make learning easier to access and (possibly) more efficient. Many academic institutions—perhaps most major universities—provide on-line courses that students can take at their own computers, usually at home. Often, students dictate how quickly they complete a course while professors provide on-line guidance and feedback. In some cases, online course mimic traditional in-class instruction by having the entire class online simultaneously.

E-learning defined

The definition of e-learning depends in large part on the goal set for the learning activity. A broad definition could be,

> *An on-line learning environment in which students interact with technology to gain new information.*

Students using the Internet to learn new material may do so by participating in on-line discussions, researching library material, navigating through a lecture, or responding to posted articles**.** Pinpointing a single definition is difficult because e-learning is constantly changing. As businesses and universities try new ways of delivering content to their students, the definition will evolve.

This new approach to teaching and learning has dramatically affected conventional ways of looking at education and training. It is no longer necessary to have a teacher working in a classroom with students. Instructors must assume new roles and learn new skills to establish an effective e-learning environment. Students are required to be self guided and engaged when learning on-line. The classroom setting that uses traditional lecture format can promote passivity, allowing students to “spit back” information instead of understanding and processing new material. Because on-line learners must directly interact with new content without face-to face instructor guidance, a student must carefully read and analyze in order to demonstrate knowledge of new material.

An employee need not travel to learn new skills. People can now communicate in an on-line environment to ask questions, solve problems, and discuss pertinent issues. This new mode of teaching and learning has the potential to enable students to become more active participants in their own learning.

Why is e-learning an effective tool

E-learning is argued by its proponents to be an effective tool for instructors, students, and organizations. Instructors can organize content on-line, working when and where convenient. It is not necessary for them to travel to a classroom, but rather they can provide feedback and assessment from their office or home. Instructors can also adapt on-line information to the needs of the class or individual student.

The claimed benefits of e-learning are perhaps even greater for students. A student can work when and where he or she wishes; and while instructors often set deadlines for projects and course completion, students can work at their own speed. Students need not worry about missing a class and falling behind because course material is accessible any time and any place. Students must also be more active in order to successfully learn in an on-line environment. It is not satisfactory to read or listen to material passively. A student must navigate through material and ask questions or post responses to other learners' comments. It is possible—in principle—to create a learning environment more effective than that in a classroom. E-learning requires that all students are accountable for thinking about and analyzing new material.

Businesses and academic organizations are reaping the benefits of e-learning as a teaching and training strategy. The cost of operating facilities that host locations for training can be reduced, and on-line learning reduces the cost of travel and salary for time spent in training. While the up-front cost of developing on-line material is expensive, companies can save even more through reduced travel and salary costs.

Scope of Use

Colleges and universities, the US Government, and businesses have quickly adopted e-learning. Colleges and universities typically have on-line research resources, and some have developed on-line courses in which the professor designs and facilitates student learning. Almost all use on-line materials to supplement otherwise traditionally delivered courses. On-line courses enable students who work full time jobs or have children to take care of to actively pursue degrees and certifications.

The US Government is developing e-learning initiatives that enable workers to be trained efficiently and at cheaper cost than with traditional instruction. The Department of Defense has also implemented major e-learning initiatives under the Departments of the Army, Navy (see http://www.navylearning.navy.mil/ and http://www.lifelines2000.org/services/education/index.asp?action=lnk&AttribID=434), and Air Force. There are two distinct goals for most of the military on-line learning: to train personnel for improved job performance and, in the Army and Navy's case, to allow personnel to earn college degrees and certifications while deployed on duty assignment. Because military personnel travel throughout the world, making on-line training and university courses available enables them to continue to pursue training needs or academic goals without interruption. This is, in essence, an evolution of the military's on-site continuing education programs that were so actively pursued following WWII. Of note here is that these programs tend to focus on leadership, technology and basic college courses rather than for engineer and architect professional development. The Defense Acquisition University (www.dau.mil) does have an

active e-learning program that supports the Defense Acquisition Improvement Workforce Act training needed as part of the Community Management and Facilities Engineering Career Field development.

Businesses and private industry are at the forefront of utilizing e-learning to train employees at lower cost and with less time away from the office. On-line learning enables employees to access new information about products quickly and without travel. But, the goal of e-learning strategies for businesses and the Government is far different than that of the university or academic institution. The former seeks to train employees and military personnel for hands-on, work related tasks. The latter provides job training, but also teach courses of general education, for example, in the humanities and social sciences which emphasize abstract ideas and concepts. It is possible to use e-learning to both train and teach. Training is task-specific and product oriented, while teaching is focused on understanding new ideas and constructing new paradigms.

Potential disadvantages

While institutions are quickly adopting e-learning, there are also hazards to on-line learning strategies. If an organization does not enable learners to effectively use technology to learn, then e-learning will not be a successful tool. Enabling employees or students requires preparation as well as willingness to invest in content development and computer systems. Table 1.1 describes some of the roadblocks to establishing a successful e-learning environment. Each of these potential problems can be overcome if the organization makes a commitment to establishing an effective learning environment. If employees, instructors, students, and support staff are adequately prepared to experiment with a new training or educational method, the chances of success are good.

E-Learning is most effective when learners and facilitators are willing to experiment and dedicate quality time to developing a successful on-line environment. A learner needs to be well equipped to participate by adequate training and having access to the necessary technology. Students work best when collaborating with others to solve problems and discuss content material. Discussion forums and reader feedback enable learners to share ideas, ask questions, and experiment with solutions to problems or concerns.

Relationship of e-learning to knowledge management

The European Commission (2001) describes *knowledge management* as the set of “critical issues of organizational adaptation, survival and competence against discontinuous environmental change [faced by modern organizations]. Essentially [KM] embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings,” a definition proposed by Malhotra (2001). This also summarizes key issues of e-learning strategies. Knowledge and information are not the same: information can be generated by database systems and computers, whereas knowledge is something that exists in a subjective context of what actions might be called for in light of available information. Organizations today approach e-learning from the perspective of the impact that professional training has on organizational performance.

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KM lets organizations preserve expertise inside a knowledge management system and share that resource using e-learning as the way to train staff, and also to provide just-in-time reference for day-to-day needs. This is especially the case when staff personnel need to access and apply information that is normally outside of their field of competence. Thus, e-leaning is an important component of any program of knowledge management.

Table 1. Potential limitations of e-learning

Potential Roadblock	Description
Information Overload	Students can be overwhelmed by too much information, specifically too many hyperlinks that distract one from the specific lesson or too much written material per page (Beer 2000).
Instructor unfamiliar with web technology	In the case of University or college instructor, a professor unfamiliar with web technology might find it difficult to organize and present content material as intended (Beer 2000).
Learners lacking technology skills	Students who do not have access are unfamiliar with e-learning technology might struggle to successfully learn new material
High Web Development Costs	It is expensive to develop content material and facilitate student learning. This might hinder some organizations from making an e-learning development investment (Beer 2000).
Poor Content Organization	Instructors must organize new information such that it builds on previously learned knowledge. Also, content must be presented so that it does not confuse learners and allow for misunderstanding concepts or instruction
Lack of authentic learning	Facilitators must make learning authentic or practical for learners. If a student does not clearly see how to utilize new information in day-to-day experience, the new knowledge will be lost (Rosenberg 2001).
Individual Student needs not met	Each student learns in her or his unique way. Some struggle with reading large quantities of written information or learning without simulation or examples (Rosenberg 2001).
Increased Instructor Effort	Sometimes, developing and facilitating an e-learning environment requires more time spent by the instructor. Also, transferring the classroom experience to a web-based experience can be tricky and time consuming [Horton, 2001 #8].
Learner Fear: Impersonal Learning Environment	Some students need human interaction to feel comfortable in a learning environment. They fear that they will be out on their own without help from instructor or classmates [Horton, 2001 #8]
Learner Fear: Distance from Instructor	Some students fear that they will not be able to ask questions or address concerns when needed [Horton, 2001 #8]
Learner Fear: No classmate connection	Learning often happens in collaborative situations. Some students fear that they will not be able to connect with peers to solve problems.
Learner Fear: It's new!	If learners are comfortable with traditional methods of training and education, it can be difficult to enable them to try something new [Horton, 2001 #8]
Potential High Dropout Rate	Because there is little face-to face interaction between students and teachers, many lose the feeling of being invested in an e-learning coarse [Horton, 2001 #8]
Lack of Student Motivation	Many students lose motivation to complete tasks and assessments without a personal connection to peers and instructors [Horton, 2001 #8].

Pedagogy of e-learning

Pedagogy is the art or science of teaching. The Oxford English Dictionary defines the term as, the "function, profession, or practice of a pedagogue; or the work or occupation of teaching" (Brown 1993). In classical Greece, a *pedagogue* was the household retainer who took children to and from school, and this evolved into a meaning of the form, "one who has oversight of children." Eventually this became, "a person whose occupation is the instruction of children or youths: a schoolmaster, teacher, or preceptor." The root word derives from the Gk. for boy or child, and thus shares an etymology with words like pediatrician.

Because e-learning necessarily involves teaching, it is essential to develop methods of successful practice so that students can learn. The role of teachers and teaching, in addition to technology is important in e-learning environments. Students need instructor feedback, performance assessment, and active participation to test comprehension. There is a growing perception in the academic literature, and, also in corporate training that, too much importance has been paid to the technology of e-learning and not enough to the pedagogy - too much concern about software and systems, and too little concern about how people interact with computers and how people absorb concepts. This seems to be changing as e-learning results attract ever more scrutiny.

Table 2. Pedagogical strengths of e-learning

Characteristic
Individualized modes of learning
Student motivation
Active participation
Flexible time management
Community of learners
Continuous assessment

Students who participate in e-learning have individual needs based on job or educational position, and learning style. E-learning participants might be university students, employees at a company, or personnel seeking specialized training. The goal of the student should largely determine how the e-learning environment is organized. Students learn most successfully in an environment of collaborative interaction with other students. It is essential for teachers to help students stay motivated and on track, because technology-based learning can lead to feelings of isolation. Teachers must also structure content and presentation of new material to increase comprehension and decrease misunderstandings and frustration.

Traditional pedagogical principles

The traditional principles of pedagogy that have evolved over the millennia since antiquity are as applicable to e-learning today as they have been to traditional classroom teaching in the past. Among these—but by no means an exhaustive list—are,

1. **Qualitative nature of the learning goal:** The best learning is that which most effectively provides the foundation for subsequent self-learning.

2. **Diversity of teaching and learning modes:** There is a diversity of modes of teaching and of learning. Not everyone learns most effectively in the same way. Most people learn best by interacting with others, whether by personal interaction or through reading. Self-discovery learning may be powerful, but it is not the common mode.

3. **Motivation:** The learner who wants to learn, learns best. Motivation is encouraged by many things, but an appeal to the imagination is perhaps as strong as any other motivating factor.

4. **Dynamic between teacher and learner:** Teaching and learning are intertwined. The most effective learning depends on the relationship between teacher and student. Feedback should be shaped by an understanding of the learner and his or her progress. If one approach fails to reach a particular student, the system should allow other approaches.

5. **The place of (offline) reading in e-learning:** Reading is an essential part of interacting with detailed substance and concept, and of motivating imagination. Online sessions are relatively short, and the quantity of material that can be transmitted online is relative small. Furthermore, research has shown that people read only about ¼ as fast online as they do from paper. Thus, the quality and quantity of downloadable documentation is important to the effectiveness of e-learning systems.

6. **Discipline:** The highest rewards of learning, both for the individual and for the organization, are hard won. Learning is enhanced by inspiration, example, and exacting standards. These need to be replicated in the e-learning environment just as they are in the classroom.

In developing e-learning programs, the traditional pedagogical principles need to be honored. Their importance has not been diminished by the rise of technology.

Diversity of teaching and learning modes

Each student approaches new knowledge in her or his own way. Some people absorb and comprehend new information when they read it. Some need to hear the information, and others understand best when they see it represented visually. Modes of teaching should be adapted to modes of learning: (1) acquisition of basic knowledge through direct instruction, (2) acquisition of basic skills through practice and coaching, (3) enlargement of understanding through discussion with others, (4) learning by memorization (as with multiplication tables or rules of grammar).

There are also different environmental needs for students. Many students feel most comfortable when they can work with others, while some work best individually. There are the students who require a hands-on approach to learning, such as tactile manipulation of objects, while others are more successful at listening and simultaneously reading new material. The success of a student depends, in part, on how well an instructor can accommodate individual needs. Obviously no course can cater to every student individually, but it is a necessary part of an instructor’s job to

organize and present new content in a way that accommodates as many learning styles as possible.

One of the benefits of e-learning is that a student can learn new material in several ways. The easiest way of displaying information on-line is in writing, but instructors also may incorporate graphs and pictures that highlight main points. On-line video and video teleconferencing among instructors and students may appeal to those learners who prefer to see or hear new material. Many on-line environments also provide discussion forums in which an article or piece of pertinent information is posted and students respond using e-mail. Students can comment on the posted material or a comment made by a classmate, but the end result is a forum for questions and exploration of new material. Questioning, analyzing, and extending new information to real life situations leads to an effective learning environment. Because these strategies are fairly easy to implement and students can be trained in the use of new technology, it is possible to develop an environment of intense learning for students and instructors.

Table 3. Selected links to on-line resources on modes of e-learning.

Resource Organization
Global distance education network World Bank
E-learning communities American Society for Training and Development
E-learning center International Business Machines
E-learning overview American Productivity and Quality Council
Best Educational E-Practices St. Petersburg Community College
Personalized approach to learning InfoWorld Magazine

Student Motivation

People use e-learning for a variety of purposes. The college student may wish to take a course at her or his own pace without the inconvenience of traveling to campus. A professional might seek training to increase job performance and productivity. A military person might complete courses in pursuit of a college degree or to get training about a new product or information at any time anywhere in the world. Whatever the purpose of using technology for training and learning, a student must be *motivated* to complete coursework and begin to use new information in day-to-

day life. Motivation is a complicated concept, especially because each student will be motivated by her or his individual set of needs and goals. E-learning can be highly motivating if the goals for the learner are clearly defined, such as job performance or earning credits for a certification or degree. On-line learning goals must be appropriate for the needs of the learner and be integrated into what the student already knows. If it is difficult for a student to access the technology, he or she will be less inclined to utilize it. A highly motivational e-learning environment is one that is easy to navigate, focused on the needs of the learner; provides practical information for day-to-day use, and student centered (reaches students with varied modes of learning).

Time Management

A student participating in on-line coursework typically has a full schedule. Part of the attraction of e-Learning is that people who have jobs and other obligations can effectively get the training or education they need at their convenience. Because e-Learning users tend to have such full lives, it is in the students and the facilitator's best interest to set deadlines for coursework completion. These deadlines depend on the instructor as well as the students' needs, and it can be broad, with a final deadline for all work to be done or a set of deadlines for each assignment.

In a recent study, "Seven Principles of Effective Teaching: A Practical Lens for Evaluating Online Courses," a group of five evaluators analyze the success of four on-line courses at Midwestern Universities. They developed a list of "lessons learned," in an effort to set standards for on-line courses. One of these principles is "good practices emphasizes time on task." Online courses need some sort of set deadline for students in order to be effective. The evaluators found that regular deadlines enabled students to spend the necessary (and mandatory) time on a specific task. Consequently, students were easily able to avoid procrastination and distraction due to a busy schedule. It also set up a more reliable structure in which to develop online discussion forums and contact with instructors. And although setting deadlines for tasks places more responsibility in the hands of instructors, it ultimately allows a course to run more smoothly, decreases student dropout due to motivational issues, and sets a standard for student expectations.

Developing a Community of Learners

Traditional views of education suggest that learning is best done when an individual works alone to complete his or her own work. Contemporary educational theory counters the old point of view, suggesting that learners understand and utilize new information when individuals work in groups. By working with fellow students towards a common goal, people are better able to communicate ideas, share new information, and synthesize content material to successfully incorporate it into job performance or day-to-day experience. If people are asked to work with colleagues to solve problems or assist customers, then training should involve a group dynamic. Individuals rarely work alone, and developing a community in which people can learn continuously and collaboratively will better enable employees to achieve a common goal.

The term, "community of learners," can be defined as a group of people working at the same time to learn new information. In an e-Learning environment, a community of learners is a group of students and an instructor who web-technology to acquire new skills and understand new

concepts. These students share ideas, pose questions for the group as well as the instructor, and work together to solve problems. While the instructor or facilitator is the manager of this on-line learning environment, a community of learners is more student centered than traditional approaches to education in which an instructor gives assignments for students to work on alone and receive feedback from the instructor only.

Developing a community helps students' motivation. If learners are working collaboratively and depend on each other for support in the learning process, then each student must participate actively in order to maintain the community environment. The learning process occurs most successfully when students feel a part of a group who is learning material that will increase job performance or earn educational credentials. The group setting also alleviates students' fears of using technology to learn. A group of students offer support to each other as well as a means to share and explore new ideas.

A successful community of learners requires the following (Beer 2000):

1. **Collaborative Projects**: Working in groups helps students to present individual opinions and use the help of fellow learners to test the validity of new ideas. Collaborative learning also helps to appease student fears of working alone via the medium of technology.

2. **Mentorship on behalf of instructor or expert**: While students may rely on each other for gaining insight about new material and sharing ideas, it is vital to the success of a student to have some sort of mentorship. Learners need to be guided in the right direction, aided in solving problems, and given feedback on how well they are progressing in their learning.

3. **Moderated discussions to solve problems**: This is a structured web-based discussion in which students can discuss content materials as well as questions to be answered by the group. These discussions should be moderated by the instructor who may give occasional feedback, but the discussion should not revolve around her or his agenda. Instructors will serve to keep the discussion focused and perhaps offer questions for students to think about. Within these discussions there should also be an understood etiquette that dictates appropriate responses and interaction between students.

4. **Trust between instructor and students as well as among students**: This requires some work on behalf of the instructor of the course. In a traditional classroom environment, students learn the mood of the class by reading body language and verbal cues the reflect acceptance. Because an on-line situation is not face-to-face, it is necessary for facilitators to be clear about instruction and feedback. Comments from the instructor and from students should be thoughtful and non-accusatory. It is easy for written language alone, especially during an on-line discussion to offend and break up the community of trust.

5. **Common objectives for all learners**: This enables all students to work together to achieve a common set of goals. Developing a community requires that all people have the same focus regardless of professional or educational situation.

6. **Contact with instructor:** It is essential for an instructor to offer praise or constructive criticism in relation to student progress. While each individual can rely heavily on other

members of the community to understand new material, the facilitator must be an active source of information and guidance

7. **Potential for learner to deal individually with instructor if necessary:** If a community is not working well together or a student has a question that the group cannot answer, it should be easy for a student to deal directly with the facilitator of the course. Because the group is in the process of learning, it is vital that individuals are not neglected due to the majority needs of the group.

Role of the instructor

The role of the instructor who manages an e-learning environment is somewhat different than the roles a teacher or instructor plays in front of a classroom. Not only must one design content information and aim instruction to meet specific educational objectives, but also make sure that individual student needs are met in an environment where people never talk face-to-face. A teacher who uses a virtual classroom must be perceptive of students' response to presented material and also an active participant in the e-learning paradigm. Instructors must think carefully about how to structure content and assignments appropriately. They must also be comfortable with using technology and perhaps experimenting with technology tools. Students can easily misinterpret an instructor's feedback if it is not timely and succinct. For example, an instructor who uses ALL CAPITAL LETTERS to give feedback might be perceived as metaphorically shouting. One must be very attentive to student perceptions when trying to enable a community of learners to successfully complete a course. The following list is a broad set of guidelines an instructor should use to establish a successful virtual classroom environment (Beer 2000):

1. **Keep lectures short and concise**. Intersperse discussion and examples between sections of lecture to ease the intensity of the content and allow students to ask questions and respond appropriately.

2. **Enable learners to participate**. This may require that an instructor call on a particular student to respond to a question or it may entail an instructor to participate as a guide in classroom discussion and actively encourage all students to contribute

3. **Keep on-line office hours**. Because communication between instructor and student is essential to learning, it is necessary for an instructor to a lot specific times that a student could "chat" with her or him. Just as a college professor is available at certain times during the workweek, an on-line teacher should also be available. Students need to have an opportunity to discuss issues and questions one-on-one with their teacher.

4. **Provide a syllabus**. This should contain the schedule of assignments with due dates as well as a schedule of lectures and synchronous discussions. If an instructor establishes asynchronous discussions (which is often preferable), days and times of discussion initiation and termination should also be posted.

5. **Keep class size as low as possible**. A good class size for an on-line classroom is between 10 to 30 students. If a class is large (20 students or more), it may be necessary to divide up discussions and collaborative assignments.

6. **Understand that each student has a learning style**. If an instructor uses only one form of instruction or assigns one type of assessment, then only the students who are inclined to learn more with those modes of learning will be completely successful. Technology does not have to limit educational practice, but rather it is possible to use video, lecture, visual representations, and audio equipment to enhance the learning environment. An instructor should make an effort to reach all learners; this requires that the instructor make an effort to actually get to know the needs of all of the students in the class. This can easily be done by surveys and questionnaires that determine preferred learning styles.

How to organize Content in an e-learning environment?

The question of content presentation is complicated and variable, depending on the objectives of the institution using e-learning strategies. The most important issue to keep in mind when making decisions about content presentation is when and how learning takes place. Regardless of a company or institutional objective, the fundamental reason for implementing any type of training is to teach, and to teach well one must take into account how students learn and under what conditions.

We learn new ideas and skills by connecting them to what we already know. In order to fully understand a new concept we must somehow relate it to something we have previously learned. In many ways, learning is like building a house. One must have a basic foundation of knowledge in which to build a bigger framework of ideas and skills. From the framework, we attach new concepts and more specific skills to build the walls. The more we learn, the bigger the house becomes. For instance, a student learning Calculus must have a basic foundation as well as a framework of other mathematical and analytical skills in order to successfully learn the abstract concepts of the subject. Gradually he or she will connect the new knowledge to the framework of her mathematical knowledge that is already in place.

When placing students and employees in an e-learning environment, it is equally important to assess what they already know in order to add to the framework. This might require a pre-assessment in which the instructor determines if the students have fundamental skills to actually learn new content. If students demonstrate a lack of proficiency in these skills, then the instructor knows that she or he must back up to the point in which she can catch all the students and bring them to a common point of understanding. It is important to remember that if students do not have a point of reference in which to connect new knowledge, the new knowledge will be lost and the implemented training ineffective.

Another essential teaching strategy for an e-learning environment is the repetition of new information in various forms. All students have strengths and weaknesses in terms of learning styles; therefore, presenting material in more than one-way appeals to more students and reinforces new knowledge. Also, when information is repeated, it is retained longer because students perceive it as important.

Perhaps the most important e-learning strategy is connecting new knowledge to outside "real world" experience. Often, new knowledge is lost when not put to practical use. If a student is never ask to apply what they have learned, the chances of fully understanding new kills or concepts are slim. Application of knowledge can be demonstrated in assessments, such as tests and papers, but a more effective assessment would be a real world project in which the new skills are used and students can reflect on how well they comprehended the material. Learning does not happen in an environment when students are asked to spit back information they have recently learned. Examples of this include pure memorization of facts without understanding how the facts fit into a larger context. Students must be given a forum in which to demonstrate that they either do or do not understand the practical application of new material.

Because e-learning is often used to teach specific skills or information that will increase job performance, an instructor should give assignments that directly utilize the students work experience. The necessity of applying new knowledge to practical experience is in direct correlation with the idea that students learn best in situations where they can discuss new material and ideas with other students who share similar experiences. By communicating ideas and "trying them out" with fellow employees or students, people internalize the material and use it more successfully in job related activities.

Content Organization and Learning Activities

Along with considering the process of learning, instructors must also consider how to present material. Taking into account the attention span and reading ability of her or his students, instructors should very carefully design how the content is visually organized. Lectures should be posted along with a list of its highlights so that students can take note of the most important points to remember. Lectures should be as short as possible and include practical examples of how new content fits into a larger scheme. If an instructor chooses a lecture format, there should also be time set aside for students to ask questions and comment on the material. If the instructor posts an article or excerpts from a text, there should also be a forum in which students can address confusions and concerns.

Learning activities should directly cater to course objectives and provide a practical outlet for students to explore the material. These activities should directly reflect how students would incorporate the learned material into their job performance. The following is a list of examples of learning activities along with a brief description (Horton 2000).

1. **Webcasts**: This is a more "traditional method" in which learners and instructors interact. It usually works best when instructor is familiar with what students already know about the subject.

2. **Drill and Practice activities**: Learners use specific skills or knowledge repeatedly to reinforce new material.

3. **Brainstorming**: Students work together to solve problems and critically discuss material.

4. **Case Studies**: Students discuss a real world situation and work together to solve problems

5. **Virtual Laboratories**: Students use simulated laboratory tools to conduct experiments on the web.

6. **Games**: These are computer simulations of a real world situation. Students practice application of skills without the risk of making mistakes on the job

Standards of Quality for e-learning strategies and implementation

In 1999, the National Education Association developed a set of quality standards for distance education. This checklist is intended to help maintain quality education for companies and academic institutions that are adapting to the changing needs of employees and students. The NEA believes that in order for an e-learning strategy to be successful it should:

1. Be at least as rigorous as similar courses delivered by more traditional means.

2. Meet accreditation standards.

3. Have content that is relevant, accurate, meets state and local standards, and is subject to the normal processes of collegial decision making.

4. Meet the objectives and requirements outlined in official course description.

5. Have student/faculty ratios that ensure the active engagement of students and high academic achievement.

6. Have appropriate procedures mutually agreed upon by the instructor and the institution for evaluation and verification that the student is submitting his/her own work.

7. Have instructors whose qualification are the same as those of instructors teaching in traditional classes and who are prepared specifically and comprehensively to teach in this environment.

8. Be integrated into the mission and consistent with the overall offerings of the institution.

9. Provide fair use exemptions for participants' access to copyrighted material for educational purposes.

The NEA also suggests that the institution offering on-line courses should provide the necessary and adequate infrastructure, needed resources, and libraries as well as the facilities and equipment students need to successfully complete coursework. The NEA has also laid out some general standards for students' rights in a on-line learning environment. These standards are as follows: appropriate technical support and student services, accurate course descriptions and expectations, interaction with the instructor, and interaction with other students regarding course material. These standards are meant to be used by companies creating e-learning tools and

strategies as well as institutions who are seeking to utilize e-learning for training and educational purposes.

Table 4. Online resources and links

E-Learning Resource List	
On-line Publications	
CIO Magazine	http://www.cio.com/research/elearning/
E-Learning Magazine	http://www.elearningmag.com/
Government Executive Magazine	http://www.govexec.com
Information Week	http://www.informationweek.com/
Washington Technology	http://www.washingtontechnology.com
Military	
Navy	http://www.navylearning.com/
Army	http://www.earmyu.com/
Business	
Advanced Distributed Learning	http://www.adlnet.org/
Blackboard Inc.	http://www.blackboard.com/
Cisco Systems	http://www.cisco.com/
Click2Learn	http://www.click2learn.com
Microsoft	http://www.microsoft.com
Plateau Systems	http://www.plateausystems.com
The World Bank	http://www.worldbank.org
Universities	
George Mason University	http://www.gmu.edu/newtech/index.html
University of Maryland E-Learning Program	http://www.elearning.umd.edu/

Who is using e-learning?

E-learning has been widely used by businesses, the United States Military and academic institutions to train employees and offer technology based instruction to students who need something other than a traditional means of education. E-learning is saving businesses money and decreasing the time employees spend away from the office. And, because military persons can receive training via web-technology, it is now possible to deliver job training as well as educational credentials to people working overseas and in environments that are not compatible with traditional modes of training.

The World Bank Institute is currently implementing e-learning strategies to establish educational programs that span the globe. The World Bank's Development Education Program (DEP) focuses on the educational needs of developing nations and building education networks between countries in order to increase awareness of a commitment to sustainable development. Among the extensive list of partnerships the World Bank Institute uses to maintain such a widespread educational program is SUN Microsystems, 3Com, Microsoft, and Lucent Technologies. The World Banks goal is to offer developing nations educational opportunity in order to enable economic development. The focus of the World Bank Institute is largely at the secondary school level.

Companies, like Click2Learn, WebCT, and Blackboard are working to establish e-learning strategies and tools that will ensure quality training and education for businesses and academic institutions. Clck2Learn has established a set of e-learning standards in an effort to make courses and learning platforms compatible. Incompatibility between learning platforms can cause problems for students and institutions using web-based learning to train employees in different locations who have different technology equipment. Click2Learn's philosophy begins with considering the ways in which students learn and how businesses should incorporate learning into training methods. Blackboard is a company focused on educational needs of academic institutions as well as corporate institutions. Blackboard offers customized academic portals as well as course management tools and a support community. It is also contributing to the development of standards for the e-learning community, but this is a work in progress and there still remains problems with compatibility and seamlessness among learning platforms. SAIC has recently launched an education portal that provides educators access to professional development resources as well as Web pages for individual classes. Although SAIC is not offering total e-learning strategies for public schools, it is in tune with the growing need for academic institutions to utilize web technology to enhance learning.

Many, if not most, colleges and universities are also using web technology to create courses and enhance communication between professors and students. George Mason University offers several on-line courses in which an entire course will be held on-line with multiple lectures and activities posted for students. GMU caters directly to the needs of students who work full-time jobs and seek to earn a degree or job certification. These courses are as rigorous as those taught in the classroom and provide equivalent college credit. The University of Massachusetts Lowell has developed an on-line CyberEd program. This distance-learning program offers full credit University courses ranging in topic from writing to computer programming (http://cybered.uml.edu). IntraLearn is providing Umass with course development and course

management tools. The on-line courses are taught by University professors who also teach in the traditional classroom setting.

The United States Coast Guard, along with Hewlett-Packard, has recently launched an effort to establish an information exchange portal. The purpose of the portal will be to consolidate information posted by the various Coast Guard offices and connect 80,000 employees and volunteers throughout the country. The information exchange portal will provide a well-organized and easily accessible resource for both the Coast Guard employees and members of the public who rely on Coast Guard information.

The United States Military is also increasing its e-learning initiative by providing on-line training and courses to military persons. The Air Force Air Education and Training Command is utilizing Plateau's Enterprise Learning Management System as a platform for managing and implementing its advanced distributed learning program. Active duty personnel as well as the National Guard and Air Force Reserves will use the ADL program to receive technical training. This project also has the potential to provide flight training for military persons around the globe. The Air Force has used the help of Plateau to reduce travel expense and enable training to be fast and efficient.

The United States Navy has also implemented a powerful e-learning network. THINQ Learning Solutions has revamped the Navy's original e-learning initiative by opening it up to 1.2 million sailors, retirees, family members, reservists and civilians. This initiative offers on-line courses, creates student profiles, and enables students and teachers to communicate on the web. The Navy also intends to implement virtual classrooms and interactive video into the program.

The United States Army is using e-learning strategies to enable military persons to complete college degrees anytime and anyplace. Through a network of over 30 colleges and universities, military persons can complete college coursework over the Internet by using a laptop provided by the Army. Students pay for their books and a portion of tuition, and they are able to choose courses from any of the 30 academic institutions. The philosophy driving the initiative is an educated military person is essentially a better military person. But, the demand for a college degree in order to get a well paying job21 has been a great deterrent for some potential military persons. Previously, military persons had a hard time earning an advanced degree due to job demands and frequent relocation. The Army hopes to attract military persons with this benefit and enable them to earn degrees at their own pace and reduced cost.

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